

Educating public servants in GIS: Reflections on the educational needs of the Public Sector in Greece

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Abstract

Despite the large amount of digital data produced for the public sector, public servants feel cautious, unsafe or ignorant of how to use them. To promote the dissemination of those data, the Training Institute of the National Center for Public Administration and Local Government introduced the program "Managing urban, regional and environmental data with GIS", a one-week, thirty five-hours, theoretical and laboratory-teaching course designed for people with little or no experience in GIS. The aim of this work is to present the major outcome of this training course through a questionnaire concerning the profile of the attendants.

Introduction

The establishment of new technologies in Public Administration remains a thorny problem. Most of the Public Services in Greece still hold a vast amount of non-digital, antiquated data. Although a large number of digital data, primarily produced for the urban and regional planning and for the environmental auditing, has been produced for the Public Sector during the last decade employees feel cautious, unsafe or ignorant of how to use them.

The Training Institute of the National Center for Public Administration and Local Government is the strategic agency of Greece for the training and education of public servants and Local Government employees and is supervised by the Minister of Interior. The Training Institute provides certified educational programs on request of every national or local bureau. In September 2009, the Training Institute introduced the program "Managing urban, regional and environmental data with GIS" under the field of application "Environment". Regional Training Institutes, who have their head offices at the capitals of the 12 Greek prefectures, also asked to participate at the program. This led up to a 22-weeks period of courses all over Greece, from October 2009 to June 2010. The aim of this work is to present the major outcome of this training course, based on the experience we have gained as GIS instructors.

The Educational program. Concept and implementation.

The program itself is a one-week, thirty five-hours, theoretical and laboratory-teaching course designed for people with little or no experience on GIS. As many people find it extremely difficult to get more than a 5-day leave, the program was designed to be as short as possible.

The program covers basic skills such as fundamentals of GIS, understanding and exploring GIS data, creating maps, working with tables and generating map layouts. Moreover, it initiates some of GIS analysis techniques including queries and spatial relationships. The software chosen to be ESRI's ArcGIS 9.3, as it is the most popular software both in public and private sector. During the five days of the program, the employees who participated dealt with a real project every day as this is the best way to develop attendants' critical thinking.

The content of the program was partially based on our personal experience on teaching GIS courses for adults for almost a decade. Moreover, being public servants ourselves, we have first-hand experience on the real needs that working people have on this subject.

An issue we took into consideration when designing the educational program, is that there is a gap between the completion of undergraduate studies and the entering in a working environment that occasionally, reaches five years. As a result, knowledge that was gained is already old especially when it concerns new technologies.

When the Training Institute announced the program and called for participation, there were a wide variety of specialties that expressed their interest. Finally, approximately 400 public servants were accepted and attended the course. There were people from varying but relevant to GIS disciplines (engineers, agronomists, geologists, foresters, planners and regional developers) originated from Ministries, Administrative Prefectures, Administrative Regions and Municipalities. Despite the fact that the 5-day course was addressed to beginners, it was attended by a considerable percentage of people with experience in the use of ARCGIS or previous versions of ESRI or other GIS software.

The adult attendants and their characteristics

Teaching adult, working people differs from teaching in an academic environment. This audience proved to have a number of common characteristics, the most important of which are:

a) A wide spread of working experience which they want to share.

Adult working people comparing to students, carry a wide range of working experience which make them feel secure and strong. Meanwhile, their background roles in society, family and working environment have created the need to connect this experience with the contents of their education. In other words, they prefer and respond better to a learning procedure that takes into account this previous working experience and pertain to things they already know and use in their everyday work. As a result, that previous experience becomes the starting point for new knowledge.

b) Precise professional goals.

In accordance with the above, adult working people attend an educational course because they have precise professional goals. For example, they want to adapt themselves to new working demands, to face imperative working needs, to be promoted, to undertake new professional role, to change working environment, to earn prestige or to build up personal growth. This is why they prefer a course with non-academic character that can provide them with "here and now" skills.

c) The need of clarifying vague and inexplicit previous knowledge.

In the curriculum of some of the specialties of the attendants GIS classes have been introduced during the last decade, whereas in Technical Universities teaching of GIS has already been introduced for almost two decades now (in early '90s). Although education in GIS is considered to be in a mature phase nowadays, the mean age of the attendants was around 40's, so it is evident that older graduates had the "aging of knowledge" problem. Likewise, many carried incomplete knowledge/experience of GIS as they had not performed GIS tasks for many years.

d) Energetic participation to class activities

Adulthood goes along with energetic participation in every aspect of life. This adapts to class participation as well. Adults want to be valued as responsible people; therefore they want their opinion to be asked and they prefer direct contact with the teacher, open communication and free exchange of ideas. In addition, they see the teacher more as a specialist or an experienced colleague. Passive and negative attitudes towards class activities stem from difficulties in learning and have to be overcome.

e) Difficulties in learning.

Adults' path to knowledge does not follow a straight line. On the contrary, there are obstacles that have to be overcome; otherwise the learning process will be jeopardized. A common problem when teaching new technologies lies in the use of computers and software. Difficulties detected between attendants who had no knowledge of GIS technology at all, as well as with the ones that possessed some knowledge of GI and spatial procedures but with limited capabilities in the use of personal computers and application software. Also social and personal duties (small children, elderly or sick people) were events of distraction especially in women.

Attendants' profile

The attendants' profile was of special interest to us as the outcome can be exploited in order to adapt or modify the teaching goals and methodologies, to the public servant's special needs. In this context we designed an appropriate questionnaire that is presented in Table 1

Table 1: Questionnaire

A. Educational background	
q1.	Degree (define)
q2.	Post-graduate studies (define)
q3.	Working domain (define)
q4.	Job position (define)
B. Working experience in the use of GIS	
q5.	Working experience in the use of GIS a. More than two years b. Up to two years c. 6 months to 1 year d. Without previous experience
q6.	Describe your tasks in your working environment
C. The GIS penetration in the public sector – New perspectives	
q7.	Do you have GIS installations in your work? a. Yes b. No c. Other (define):
q8.	Do you regard the use of GIS as a strategic tool in the public sector? a. Yes b. No c. Other (define):
q9.	Do you believe that GIS as a technology has fully exploited in the public sector even from administrative units that has obtained GIS installations? a. Yes b. No c. Other (define):
q10.	Would you like to participate in a GIS project as an opportunity to implement your acquired knowledge and work in real life problems? a. Yes b. No c. Other (define):
q11.	Do you think that cooperative actions in the public sector have to be established? a. Yes b. No c. Other (define):
D. GIS comprehension, trust and support	
q12.	Can GIS provide you with solutions in decision-making problems ? a. Yes b. No
q13.	Do you think that the use of GIS is of any help to central planning in a governmental organization ? a. Yes b. No
q14.	Will the use of GIS foster and assist national economy by means of making small to large-scale budget reductions? a. Yes b. No
q15.	Will the use of GIS by the public sector offer better responses in emergency cases or hazardous circumstances (e.g. forest fires)? a. Yes b. No
q16.	Would you propose the use of GIS in your job if there is no GIS installation yet? a. Yes b. No

The questionnaire was given to fill in during the last day of the course, in a non-mandatory basis and it focuses on four groups of questions:

- A. Educational background, working domain and job position
- B. Working experience in the use of GIS
- C. The GIS penetration in the public sector and the establishment of the new perspectives
- D. GIS comprehension, trust and support

In this work, the feedback of 110 questionnaires, corresponding to the ¼ of the total number of attendants, will be presented and analyzed.

Questionnaire analysis

A. Educational background, working domain and job position

Educational background

This first section identifies two main groups

- Engineers and
- Other scientists from University-level degrees (Figure 1)

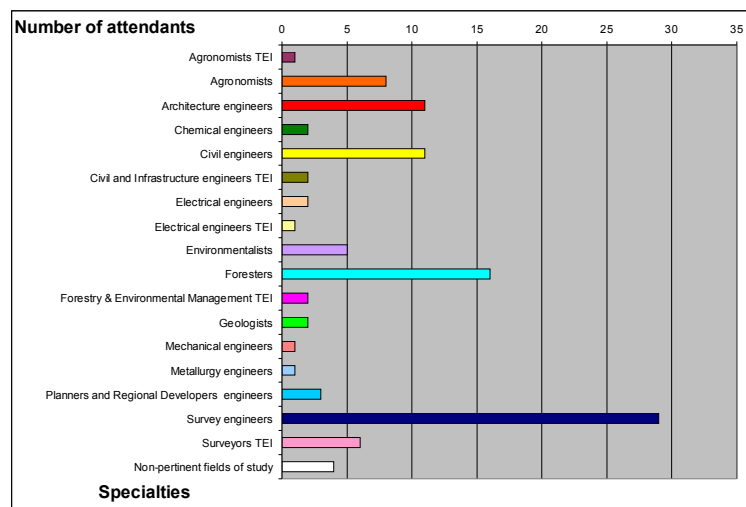


Figure 1: Educational background

More than half of the attendants, 56 %, were engineers from various fields (mostly surveyors, civil engineers, and architects). The remaining percentage of the attendants came from various relevant university level disciplines, TEI (Technological Educational Institutes) included, whereas few of them had miscellaneous degrees from non-pertinent fields of study. An interesting feature, not depicted in Figure 1, is that 27% of the attendants held a postgraduate degree (Master's mainly).

Working domain

As the government administration in Greece unfolds in three levels of administration competence from top-bottom: prefecture, region and municipality, it came as no surprise that most of the attendants come from those administrative units. A minority of the attendants, 8%, came from enterprises of public interest and an almost equal percentage from ministries.

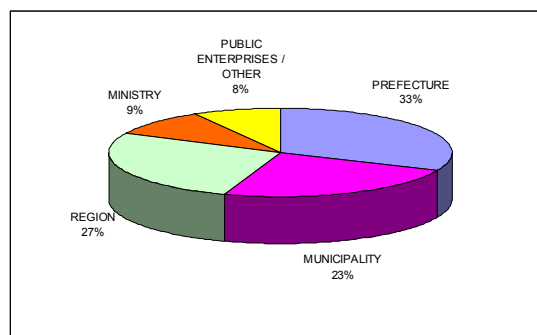


Figure 2: Distribution of the working domain of the participants

Job position

Regarding the job position of the participants, the vast majority, 82%, are employees. This is an interesting figure to discuss, as it reflects two common facts in the public sector. Firstly, employees are usually young, eager people in acquiring new knowledge -especially new technologies- and secondly, successful participation in attested courses like this can be used as an asset for promotion as it contributes to the final evaluation of the candidate. The Heads of the Departments, 16%, and the Directors/Heads of Divisions, 2%, on the other hand, not only are fewer in the administrative pyramid but they also find it difficult to get a 5-day leave from their responsible position. Both Heads of the Departments and Directors/Heads of Divisions, among their other responsibilities, manage personnel so they rely on employees' new knowledge in order to perform everyday duties.

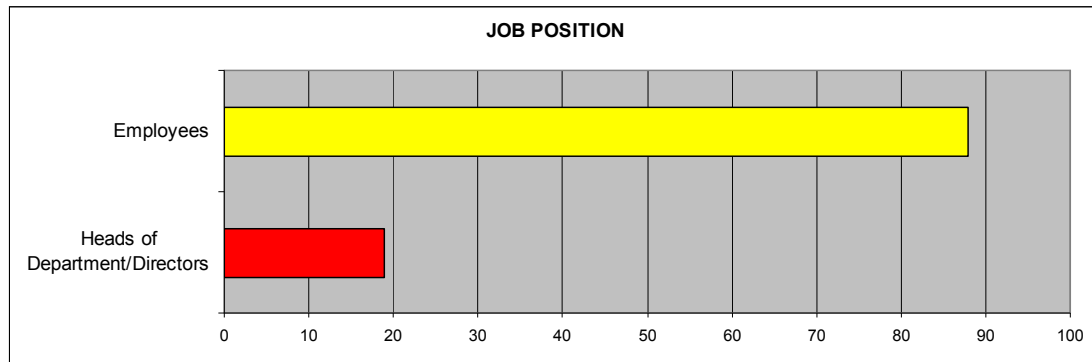


Figure 3: Job position

B. Working experience in the use of GIS

Despite the fact that the course was mainly addressed to beginners, Figure 4 shows that more than half of the participants had already some working experience in the use of GIS but not necessarily in their present working environment. Some of the attendants that had worked as free-lancers or at the private sector in the past had already been involved in GIS tasks. This is affirmed as the private companies/partnerships in Greece are the main contractors and suppliers of digital spatial data for public services. The public sector has not many competent and skilful staff to conduct massive spatial data captures and pre-processing; it is characterized by a low degree of utilization of digital spatial data till now. For this reason most of the attendants expressed their interest to be trained in more specialized GIS tasks in the future. This will be hopefully covered in a follow-up advanced course.

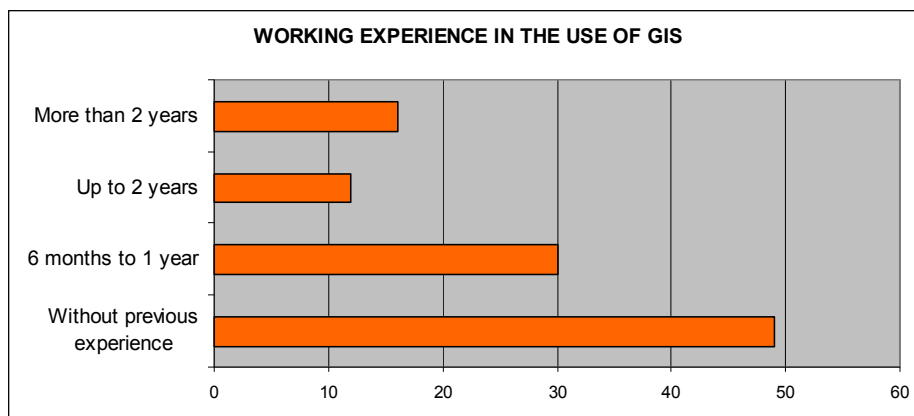


Figure 4: Working Experience in the use of GIS.

C. The GIS penetration in the public sector and the establishment of the new perspectives

The third group of questions tests the penetration of the GIS in the public sector and the new perspectives that have to be established.

Only a 30% of the participants –mostly people working in the capital of Greece, Athens and the second larger city of Greece, Thessaloniki- reported that they had GIS installations in their working environment. This reflects the low penetration in the use of GIS in the public sector, despite the abundance of existing spatial data. Lack of GIS software and digital data at the regional offices were also reported as a major problem during the course. In addition almost unanimously, 98%, confirmed that GIS as a technology has not yet been fully exploited in the public sector.

In order to discover the rising of the new perspectives that have to be established in the public sector three key questions were asked:

- 1) If they regard the use of GIS as a strategic tool in the public sector.
- 2) If they would like to participate in a GIS project as an opportunity to implement their acquired knowledge and work in real life problems
- 3) If they thought that cooperative actions in the public sector have to be established.

Everybody responded positively in all three questions. The attendants regarded GIS as a strategic tool for the public sector and many expressed their convictions that the public sector would benefit in many ways from using it. They also reported that they could improve their working procedures through the use of GIS. They also thought that the enforcement of the INSPIRE directive in Greece will initiate and finally reinforce the exchange and use of spatial data and metadata between the various public services and hence strengthen the cooperation of the various public owners of spatial data.

D. GIS comprehension, trust and support

As already mentioned above, Greek Public Administration tried to disseminate GIS by producing a large amount of digital data over the last decade. All this effort will be useless if people working in the public sector would not understand, trust and support GIS technology. From the beginning to the end of this course, some questions preoccupied us considering the capability of GIS to be fully comprehensive, whether the opening of GIS in the public sector will be successful and if public servants will trust and fully support GIS for planning and decision-making.

Seeking the answers to those questions, we designed the last part of the questionnaire (Table 2).

Table 2: GIS comprehension, trust and support

QUESTIONS	RESPONSES	
	Yes	No
q12: Can GIS provide you with solutions in decision-making problems ?	92%	8%
q13: Do you think that the use of GIS is of any help to central planning in a governmental organization ?	85%	15%
q14: Will the use of GIS foster and assist national economy by means of making small to large-scale budget reductions?	80%	20%
q15: Will the use of GIS by the public sector offer better responses in emergency cases or hazardous circumstances (e.g. forest fires) ?	93%	7%
q16: Would you propose the use of GIS in your job if there is no GIS installation yet ?	84%	16%

High, affirmative answers to all questions show that GIS were welcome with the most positive way. The attendants clarified their capabilities and started to feel more secure about their usage. Also through case studies, public servants solved real-world problems and understood the assistance GIS provide in decision-making problems. Furthermore, they explore how GIS spatial functions would help administration authorities to make better plans and act efficiently and effectively in emergency cases and hazardous circumstances.

The relatively higher percentage of no responses in questions 13 & 14 can be attributed to the fact that it is not easy for some attendants to understand that GIS can act as an Management Information System (MIS) tool in central planning – an integration of processes that they saw acting in the local level - and

how this can lead to more efficient action plans and reductions in the cost of their implementation by central government. Finally, most of them would introduce GIS in their job if they had the opportunity / authority.

Conclusion and outlook.

A GIS program that provides public servants with immediate applicable skills, deals with real data they encounter in their working environment and take into consideration the specific characteristics they have as adult attendants, meets the educational needs of people working in the public sector.

Another considerable issue for a successful GIS course is that limited capabilities in the use of personal computers and application software must be overcome before enrolling for the course.

The time span was short and the material to be covered substantial for the beginner, so there was always a need to provide additional assistance to those who were introduced for the first time to GIS. Time pressure also prevented us from pursuing some stimulating but time-consuming teaching techniques

The low penetration in the use of GIS in the public sector, is a fact which treatment exceeds the objectives of the course

Lack of GIS software and digital data especially at the regional offices of the attendants was defined as a major problem after completing the course. The problem was partially addressed for those not having GIS installations by obtaining 2-month evaluation copies of GIS software. Many of the attendants regarded the courses from a managerial perspective and expressed their discomfort for the incompleteness of the management and administration in various segments of the public sector. Overall, very few of the attendants failed the course. That was due to unsuccessful participation in the course (absence for professional/personal reasons). Most of the attendants made their best efforts to cope with the material covered

As it is evident from the responses of the attendants during the evaluation, the whole program proved to be a success. The high percentage of the positive responses show the awareness of the most of the participants in the course's key-issues. What most reflects the attendants' interest is that almost unanimously asked for a second-level course covering more advanced topics. The following consideration factors allow us to hope for the future use of GI in the public sector:

- The exchange of ideas, flow of information and cooperation at the local user level between the employees of public services in a bottom-up process and
- The ongoing availability and accessibility of terabytes of GI data globally and with mapping services through the Internet